

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A code division multiple access user equipment, the user equipment ~~receives~~ configured to receive a plurality of K data signals over a shared spectrum, the user equipment comprising:

means for transmitting spread spectrum communication signals over the shared spectrum;

means for receiving and sampling a combined signal having the K transmitted data signals over the shared spectrum;

means for producing a combined channel response matrix using codes and impulse responses of the K data signals;

means for determining a block column of a cross correlation matrix using the combined channel response matrix, each block entry of the block column being a K by K matrix;

means for taking a Fourier transform of a complex conjugate transpose of the combined channel response matrix multiplied to the combined signal samples;

means for multiplying an inverse of a Fourier transform of each block entry to a result of the Fourier transform to produce a Fourier transform of the data vector; and

means for taking an inverse Fourier transform of the data vector Fourier transform to produce data of the K data signals.

2. (Currently Amended) The user equipment of claim 1 wherein the means for taking a Fourier transform is configured to take ~~taking~~ the Fourier transform is by multiplying the conjugate transpose of the combined channel response matrix to the combined signal samples and to take the ~~taking~~ Fourier transform of a result of the conjugate transpose multiplication.

3. (Currently Amended) The user equipment of claim 1 ~~wherein~~ including means for using a Colicky decomposition of the block entries of the diagonal matrix ~~is used~~ to determine the data.

4. (Currently Amended) The user equipment of claim 1 ~~wherein~~ including means for the data determining the data ~~occurs~~ over a data field time period of a time division duplex communication burst ~~and~~ where the combined signal samples extend beyond the data field time period.

5. (Currently Amended) The user equipment of claim 4 wherein the means for determining the data uses extended samples of the combined signal samples extends beyond the data field time period for a length of ~~the~~ an estimated impulse response.

6. (Currently Amended) The user equipment of claim 4 wherein the means for determining the data uses combined signal samples that extend ~~extends~~ beyond the data field time period so that a length of the combined signals is a length compatible with a prime factor algorithm fast Fourier transform.

7. (Currently Amended) A code division multiple access user equipment, the user equipment ~~receives~~ configured to receive a plurality of K data signals over a shared spectrum, the user equipment comprising:

a transmitter configured to transmit spread spectrum communication signals over the shared spectrum;

an antenna ~~for receiving~~ configured to receive a combined signal having the K transmitted data signals over the shared spectrum;

a sampling device ~~for sampling~~ configured to sample the combined signal;

a channel estimator ~~for estimating~~ configured to estimate impulse responses of the K data signals; and

a data detection device ~~for producing~~ configured to produce a combined channel response matrix using codes and the impulse responses of the K data signals; ~~for determining~~ to determine a block column of a cross correlation matrix using the combined channel response matrix, each block entry of the block column being a K by K matrix; ~~for taking~~ to take a Fourier transform of a complex conjugate transpose of the combined channel response matrix multiplied to the combined signal samples; ~~multiplying~~ to multiply an inverse of a Fourier transform of each block entry to a result of the Fourier transform to produce a Fourier transform of a data vector; and ~~for taking~~ to take an inverse Fourier transform of the data vector Fourier transform to produce data of the K data signals.

8. (Currently Amended) The user equipment of claim 7 wherein the data detection device is configured to take ~~taking~~ the Fourier transform is by multiplying the conjugate transpose of the combined channel response matrix to the combined signal samples and ~~taking~~ to take the Fourier transform of a result of the conjugate transpose multiplication.

9. (Currently Amended) The user equipment of claim 7 wherein the data detection device is configured to use a Colicky decomposition of the block entries of the diagonal matrix ~~is used~~ to determine the data.

10. (Currently Amended) The user equipment of claim 7 wherein the data detection device is configured to determine the data ~~determining occurs~~ over a data field time period of a time division duplex communication burst where ~~and~~ the combined signal samples extend beyond the data field time period.

11. (Currently Amended) The user equipment of claim 10 wherein the data detection device is configured to use extended samples of the combined signal samples that extend ~~extends~~ beyond the data field time period for a length of ~~the~~ an estimated impulse response.

12. (Currently Amended) The user equipment of claim 10 wherein the data detection device is configured to use combined signal samples that extend ~~extends~~ beyond the data field time period so that a length of the combined signals is a length compatible with a prime factor algorithm fast Fourier transform.